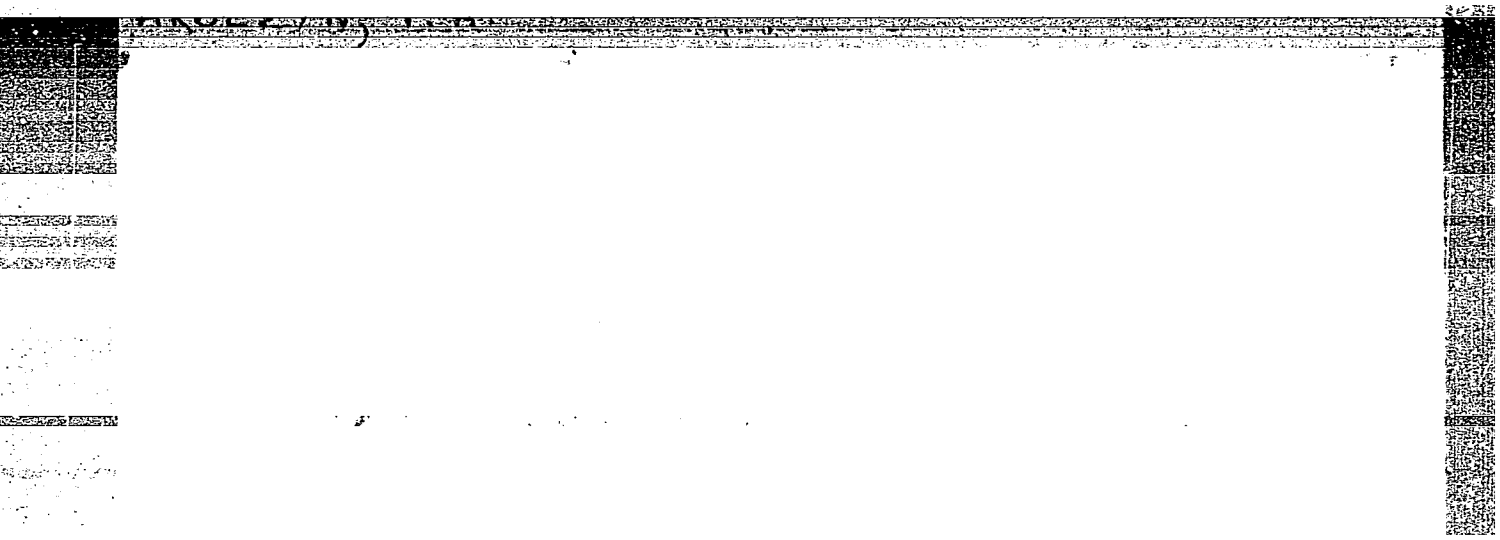

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000100710009-3"

AKOLZIN, P.A.

PHASE I BOOK EXPLOITATION 386

Akol'zin, Pavel Alekseyevich

Korroziya metalla parovykh kotlov (Corrosion of Metal in Steam Boilers) Moscow, Gosenergoizdat, 1957. 223 p. 6,900 copies printed.

Ed.: Belosel'skiy B.S.; Tech. Ed.: Medvedev, L. Ya.

PURPOSE: This book is intended for operational personnel, engineers and technicians, for workers of research, design, and planning organizations, and for students at power-engineering and chemical institutes.

COVERAGE: The book deals with the basic types of steam boiler corrosion and means of preventing it. Attention is focused chiefly on corrosion by oxygen, intercrystalline corrosion, and corrosion developing under boiler sludge ("sub-sludge" corrosion). Corrosion of boilers used in the production of heat and power is given special consideration. The monograph is based on [illegible] more recent investigations conducted by the Water Department of the Vsesoyuznyy Teplotekhnicheskiy Institut

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(All-Union Heat and Power Institute) in the field of boiler corrosion. The author expresses his thanks to the following personalities affiliated with the institute: Glushenko, V.V., scientific worker; Mikhaylova, N.M., technician; Anan'yeva, N.I., technician; and to certain personalities employed at power plants who participated in experimental work; Zaytseva, Z.I.; Kolodeznyy, B.A.; Lazareva, K.I.; Akinshina, N.V.; Pushenko, M.A.; Subbotin, N.A.; Chernova, L.A.; Shevchenko, V.I.; Shugayu, G.A.; and Yushin, D.A. Other personalities whose assistance is acknowledged are: Mamet, A.P., Doctor of Technical Sciences, author of Korroziya teplosilovogo oborudovaniya elektrostantsiy (Corrosion of Heat and Power Equipment at Electric Power Plants, 1952); Tomashov, N.D., Doctor of Chemical Sciences; and Zhuk, N.P., Candidate of Chemical Sciences. There are 74 references, of which 55 are Soviet, 14 English, and 5 German.

TABLE OF CONTENTS:

ZHUK, Nikolay Platonovich, kand.tekhn.nauk; AKOL'ZIN, P.A., kand.tekhn. nauk, retsenzent; SLOMYANSKAYA, F.B., kand.tekhn.nauk, red.; TAIROVA, A.L., red.izdatel'stva; MATVEYEVA, Ye.N., tekhn.red.

[Corrosion and the protection of metals; computations] Korroziia i zashchita metallov; raschety. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1957. 330 p. (MIRA 11:1)
(Corrosion and anticorrosives)

8(6) SOV/112-59-2-2517

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 2, p 34 (USSR)

AUTHOR: Akol'zin, P. A., and Ratner, A. V.

TITLE: Transcrystallite Corrosion of Metal in High-Pressure Boiler Drums and Tubes (Mezhkristallitnaya korroziya metalla barabanov i trub kotlov vysokogo davleniya)

PERIODICAL: V sb.: Vnutrikotloviye fiz.-khim. protsessy, vodopodgotovka i vodn. rezhim kotlov na elektrost. vysokikh i sverkhvysokikh parametrov. M., AS USSR, 1957, pp 384-395

ABSTRACT: An instrument is described which is used for investigating transcrystallite corrosion of metal subjected to pressures of over 100 atm. The instrument is equipped with chlorine-silver and nickel electrodes for electrochemical measurements. Ten such instruments were placed in an air thermostat at 320°C; a pressure of 100 atm was created inside the samples and a stress of about 25 kg/mm^2 was set up in the weakened part of the sample.

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SOV/112-59-2-2517

Transcrystallite Corrosion of Metal in High-Pressure Boiler Drums and Tubes

The aggressiveness of the medium was evaluated by the time required for flaw formation in the sample neck. This action was compared with the sample behavior in a certainly noncorrosive distillate. Effect of the density of polarizing (anodic or cathodic) current on the time of flaw formation is explained. The influence of niter and other salts as well as some organic substances upon the above process was studied. An analysis of cases of transcrystallite corrosion of high-pressure boilers is presented. An inference is drawn that the transcrystallite corrosion is more severe in high-pressure boilers than in medium-pressure; flaws are also formed in the drum body when the boiler water has a low alkalinity (3.5 mg-equiv/liter). Methods of controlling the transcrystallite corrosion are recommended: elimination of high stresses, nitrate treatment (up to 70 atm gauge), and phosphate-alkaline purity of boiler water.

A.P.M.

Card 2/2

AUTHOR: Akol'zin P.A., Candidate of Technical Sciences, Kagan, D.Ya., Candidate of Technical Sciences and Kot A.A., Candidate of Technical Sciences (All-Union Thermo-technical Institute , V.T.I.)

TITLE: Concerning alkali-safe conditions of boiler water. (O shchelochnobezopasnykh rezhimakh kotlovoy vody).

PERIODICAL: "Teploenergetika" (Thermal Power), Vol. 4, No. 6, pp. 32 - 35 (U.S.S.R.) 1957

ABSTRACT: The main cause of inter-crystallite corrosion of the metal of boiler drums is the aggressive action on stressed metal of boiler water concentrate. Damage is promoted by the presence in the boiler water of corrosive alkali, the concentration of which may reach dangerous values because of local evaporation of water. At temperatures above 300 °C, which are usually found in high pressure steam boilers, signs of inter-crystallite corrosion appear with a 5% solution of caustic soda.

The most acceptable condition of boiler water which ensures the absence of inter-crystallite corrosion in high and super-high pressure boilers is to maintain in them zero hydrate i.e. purely phosphate alkalinity. This is achieved by introducing into the boiler water various phosphate salts of sodium. The absence of an accumulation of caustic soda in evaporating water containing purely phosphate alkalinity and

Concerning alkali-safe conditions of boiler water. (Cont.)

also the ability of sodium phosphate to passivate steel make the zero-hydrate-alkaline condition a reliable means of preventing inter-crystallite corrosion. However, in practice certain aspects of this practice require to be cleared up.

The maximum alkalinity can be determined on the assumption that all of the alkalinity is due to the presence of the most alkaline compound -Na_3PO_4. The lower limit is set by the condition of preventing scale-formation and general corrosion, for which it is usually taken that the alkalinity titrated against phenol-phthalein is equal to 9 mg/l (pH approx.10).

A graph is plotted showing the change in the upper limit of the alkali number of boiler water under given conditions as a function of the concentration of PO_4^{3-}. A graph is plotted of the ratio of the alkalinity to phenol-phthalein to that to methyl-orange of boiler water from the salty section against the value of this ratio in the clean section, with a boiler pressure of 110 atm. In practice a purely phosphate alkalinity can only be maintained in condensing power stations, the boilers of which are supplied with high quality condensate with make-up from distillate from evaporators or de-salted water. A graph is plotted of the quantity of caustic soda formed in the salty sections of boilers with different hardnesses caused by the presence of calcium and magnesium bicarbonates in the feed water. The data shows that the concentration of caustic soda in the

Concerning alkali-safe conditions of boiler water. (Cont.)

salty sections increases with increase in hardness of the feed water. A table is given showing the amount of sodium phosphate which should be added to the feed water for various degrees of hardness of the water. Tests have established that if the excess hydrate alkalinity reckoned as caustic soda is 15 to 20% of the sodium sulphate content of the boiler water the water will be safe in respect of inter-crystallite corrosion. It is also shown that sulphate in a mixture with an equal quantity of chloride, if their total content is 15 to 20% of the hydrate alkalinity, can also prevent the formation of inter-crystallite corrosion. The presence in the boiler water of chloride is useful in preventing general alkaline corrosion.

It is concluded that the condition of pure phosphate alkalinity of boiler water in boilers without stepwise evaporation is maintained (on the basis of the index given in the article), according to the maximum content of excess concentration of phosphates being not above 40 mg/l reckoned as PO_4^{3-} and a minimum alkaline number of about 9 mg/l NaOH. Control over the condition of purely phosphate alkalinity of boilers with stepwise evaporation is effected by analysis of the boiler water from the last stage of evaporation. The maximum concentration of excess phosphates in this stage should be of

AKOL'ZIN, P.A., doktor tekhn.nauk; DANILENKO, D.A., kand.tekhn.nauk; [redacted], B.A., inzh.; KULAKOV, M.A., inzh.; SHMUYLOVICH, I.Kh., inzh.

Prevention of hydrogen corrosion by means of hydrazine. Teploenergetika 4 no.11:95 N '57. (MIRA 10:10)
(Feed-water purification)

AKOL'ZIN, P.A.

AKOL'ZIN, P.A. doktor tekhn. nauk; GLUSHENKO, V.V., inzh.; LAZARENA, K.I., inzh.; CHISTYAKOV, A.I., inzh.

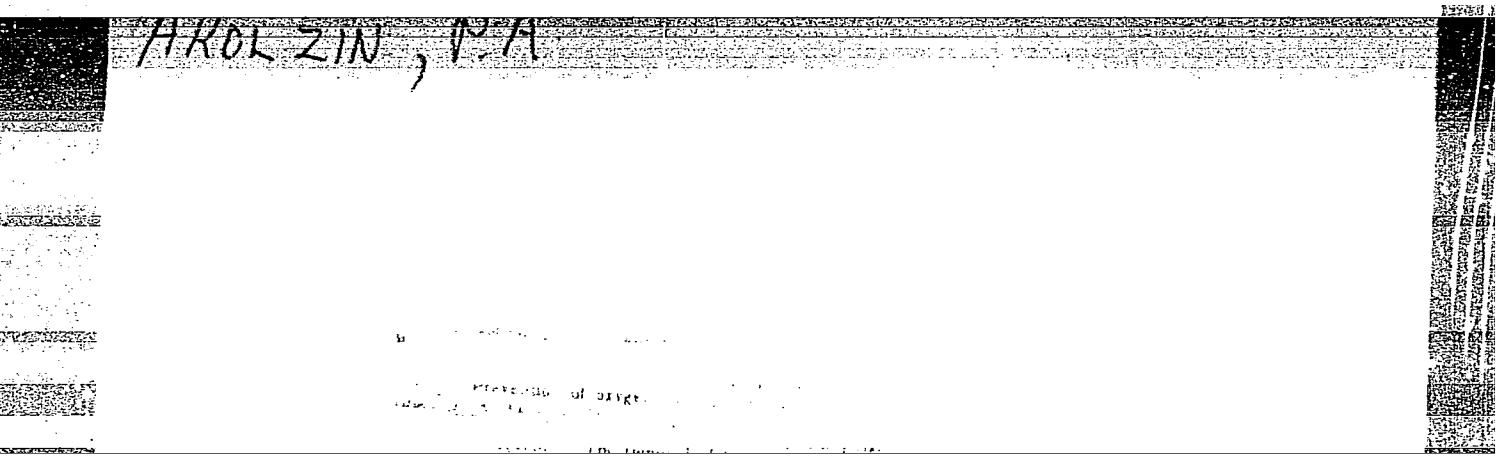
An installation for de-oxygenation of water. Teploenergetika 4 no.12: 54-57 D '57. (MLRA 10:11)

1. Vsesoyuznyy teplotekhnicheskiy institut.
(Feed-water purification)

AKOL'ZIN, P.A.; GURVICH, S.M.; KOTLYAR, R.V.; KOT, A.A.; MAMET, A.P.; MIKHAYLENKO, F.S.; PROKHOROV, F.G.; SOKOLOV, I.M.; CHERNOVA, L.A.; SHKROB, M.S.; YANKOVSKIY, K.A.; GUREVICH, L.S.; POLYAKOV, V.V.

To the editors of "Energetik." Energetik 5 no.3:11-12 Mr '57.
(MIRA 10:3)

1. Vsesoyuznyy teplotekhnicheskiy institut im. Dzerzhinskogo (for Akol'zin, Kot, Yankovskiy) 2. TSentral'nyy kotloturbinnyy institut (for Gurvich, Mamet,) 3. Teplo-elektro-proekt (for Gurevich). 4. Ministerstva elektrostantsiy (for Kotlyar, Prokhorov). 5. Teplovaya elektricheskaya tsentral'naya stantsiya No.9 (for Mikhaylenko, Polyakov) 6. Perevyazochnyy etapnyy punkt (for Sokolov). 7. Moskovskoye rayonnoye upravleniye energokhozyaystva (for Chernova). 8. Energeticheskiy institut Akademii nauk SSSR (for Shkrob).
(Boilers)



AUTHORS: Akol'zin, P.A. (Dr.Tech.Sci.) SOV/96-58-10-13/25
Zaytseva, Z.I. (Engineer)
Lazareva, K.I. (Engineer)

TITLE: The prevention of oxygen and carbonic acid corrosion of power equipment by means of octadecylamine. (Preduprezhdeniye kislorodnoy i uglekislotnoy korrozii energeticheskogo oborudovaniya s pomoshch'yu oktadetsilamina)

PERIODICAL: Teploenergetika, 1958, No.10. pp. 54-55 (USSR)

ABSTRACT: At regional power station No.7. of Lenenergo, a considerable proportion of the boiler feed-water is condensate returned from industrial consumers; it contains up to 2 mg/l oxygen and 4 - 5 mg/l CO_2. The presence of these gases gives rise to corrosion troubles, which are described. The troubles occur largely on consumers' equipment where it is not possible to remove the oxygen and carbon dioxide. Accordingly, octadecylamine, a film-forming substance, is added to the steam. The main properties of Octadecylamine are stated. It is protective because adsorbed monomolecular film forms on metal surfaces wetted by water containing [illegible] at the power station [illegible] the turbine pass-out steam by means of the measuring device illustrated in the sketch. This device comprises two tanks, one of which contains the molten reagent under steam pressure.

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The prevention of oxygen and carbonic acid corrosion of power equipment by means of octadecylamine. SOV/96-58-10-13/25

Steam is bubbled through the molten mass to pick up the required quantity of material. Preliminary operating results can now be given. The method of injecting the octadecylamine proved satisfactory in service. When the concentration of the substance in the steam was 3 - 4 mg/kg, the iron content of the condensate was reduced by a factor of 10 to a stable value of 0.05 mg/l Fe. This occurred on the third day after the reagent was first used. There have been no unfavourable effects, except for the appearance of a little ammonia in the boiler steam. Steam without additive can be delivered for some hours without ill effect. Attempts will be made to replace octadecylamines by a cheaper mixture of polyamine homologues. This method of treatment will probably be useful in other applications. There is 1 figure.

ASSOCIATION: All-Union Thermo-Technical Institute (Vsesoyuznyy Teplotekhnicheskiy Institut)

Card 2/2

AKOL'ZIN, P.A.; KORNEYEVA, L.V.

[Studying corrosion under stress of steels as applicable to the operation of steam generators in atomic power plants] Izuchenie korrozii pod napriazheniem stalei primenitel'no k rabote parogeneratorov atomnykh elektrostantsii. Moskva, Glav.upr. po ispol'zovaniiu atomnoi energii, 1960. 23 p. (MIRA 17:1)

(Steel, Stainless--Corrosion)
(Atomic power plants)

AKOLZIN, P.A.

PHASE I BOOK EXPLOITATION SOV/5256

Gerasimov, Valentin Vladimirovich, ed., Candidate of Chemical Sciences.

Korroziya reaktornykh materialov; sbornik statey (Corrosion of Nuclear-Reactor Materials; a Collection of Articles) Moscow, Atomizdat, 1960. 284 p. 3,700 copies printed.

Ed.: A.I. Zavodchikova; Tech. Ed.: Ye.I. Mazel'.

PURPOSE: This collection of articles is intended for mechanical and metallurgical engineers as well as for scientific research workers concerned with the construction of nuclear reactors.

COVERAGE: The water corrosion of various types of stainless steel and alloys under high pressures and temperatures is investigated from the point of view of the use of these materials for the construction of nuclear reactors. Attention is given to the following: the use of oxygen for protecting steel against corrosion, the behavior of steel in high-temperature

Card ~~1/9~~

water with various compositions, factors of metal stress corrosion, intergranular corrosion, the mechanism of corrosion cracking, and the corrosion resistance of aluminum and zirconium alloys. Conclusions based on test results are included. No personalities are mentioned. Most of the articles are accompanied by references. Of 238 references 97 are Soviet.

TABLE OF CONTENTS:

Card 6/9

PHASE I BOOK EXPLOITATION SOV/3854

Akol'zin, P. A., P. N. Andreyev, I. E. Apel'tsin, S. M. Gurvich, A. A. Kot, Yu. M. Kostrikin, I. I. Koshelev, A.P. Mamet, Yu. O. Novi, M. M. Sendik, I. Kh. Khaybullin

Spravochnik khimika-energetika. tom 1: Spravochnyye materialy obshchego naznacheniya (Handbook of Chemistry in Power Engineering. Vol 1: General Reference Material) Moscow, Gosenergoizdat, 1960. 327 p. 20,000 copies printed.

Eds.: V.A. Golubtsov, S.M. Gurvich, Yu. M. Kostrikin, and A.P. Mamet; Tech. Ed.: K. P. Voronin.

PURPOSE: This handbook is intended for chemists in the field of power engineering, personnel of laboratories, scientific research institutes, and planning and control organizations, as well as for students of universities and tekhnikums.

COVERAGE: This is the first of a three-volume handbook of chemistry in power engineering. It includes data on the water system of boilers, causes of corrosion and methods for controlling it. It also contains general reference material on measures and units, chemical compounds, water and solutions, solubility of substances in water and water vapor at various temperatures, electrochemistry, gases, specifications and prices for certain reagents and materials. The book includes tables, charts, and diagrams. No personalities are mentioned. There are 52 references: 39 Soviet, 10 English, 2 German, and 1 Swedish.

Card 1/12

S/081/61/000/020/063/089
B102/B147

AUTHORS: Gulyayev, V. N., Akol'zin, P. A.

TITLE: Methods for long-time corrosion-strength tests of metals at high pressures and at the temperatures of the active medium

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 264 - 265, abstract 20I208 (Sb. "Korroziya reaktorn. materialov". M., Atomizdat, 1960, 5 - 16)

TEXT: Two apparatus and methods for long-time corrosion-strength tests of specimens at high temperatures and at pressures corresponding to operating conditions are described in detail. The ВТИ-1 (VTI-1) apparatus is characterized by the following features: a) possibility of producing a high pressure for the active liquid by means of a gas or a gas mixture from bulbs; b) possibility of continuous saturation of the liquid with gas (in particular with oxygen) for production of solutions with different concentrations; c) existence of a special device for selection and analysis of gases dissolved in the liquids at operating pressures and temperatures. The ВТИ-2 (VTI-2) apparatus differs from the VTI-1 type as to the method

Card 1/2

S/081/61/000/020/050/089
B107/B101

AUTHORS: Akol'zin, P. A., Gulyayev, V. N., Laguntsov, I. N.

TITLE: Corrosion cracking of austenite steels in thermal power stations

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 260, abstract 20I153 (Sb. "Korroziya reaktorn. materialov". M., Atomizdat, 1960, 93 - 102)

TEXT: The authors describe several cases of corrosion cracking in austenite steels at heating-and-power stations observed on boilers under overcritical operation conditions (300 atm, 600°C). 1X18H9T (1Kh18N9T) steels was found to be suited for the production of heating-and-power station equipment. It is, however, necessary to control conditions and quality of the water, and take account of the specific properties of austenite steels.
[Abstracter's note: Complete translation.]

Card 1/1

S/096/60/000/010/022/022
E194/E135

AUTHORS: Margulova, T.Kh., Akol'zin, P.A., Korneyeva, L.V., Lipanina, A.A., and Khlupnov, V.Ye.

TITLE: An Investigation of Corrosion under Stress of Samples of Steel 1Kh18N9T at High Pressure

PERIODICAL: Teploenergetika, 1960, No 10, pp 95-96

TEXT: Results are given of investigations of austenitic steel 1Kh18N9T in water media containing chlorine ions at pressures of 200 atm, t = 364 °C, under static conditions (the concentration of chlorine ions ranged from 100 to 1600 mg/litre). The specimens were investigated in deoxygenated solution after austenisation at t = 1050 °C with and without work hardening. The tests lasted 400 hours.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Institute)

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S/104/60/000/011/001/001
E194/E484

AUTHORS: Akol'zin, P.A., Doctor of Technical Sciences, Gulyayev, V.N., Candidate of Technical Sciences and Laguntsov, I.N., Candidate of Technical Sciences

TITLE: Corrosion Cracking of Austenitic Steels in Thermal Power Installations With Super-High Steam Conditions

PERIODICAL: Elektricheskiye Stantsii, 1960, No.11, pp.29-32

TEXT: Austenitic steel parts of thermal power equipment have been subject to a special kind of corrosion in service; this takes the form of local corrosion cracks under stress. This article generalizes Soviet and German published work on this subject. In a once-through boiler with super-critical steam conditions of 300 atm and 600°C, corrosion cracking was observed during the conduct of special tests to investigate salt deposits for which purpose caustic soda, sodium chloride, sodium silicate and sodium sulphate were introduced into the feed water in amounts of 100, 200, 40 and 32 mg/litre respectively. The tests lasted for 3 to 4 hours with each solution. The steel in question was grade ЭИ-257 (EI-257) Damage of a transcrystallite character appeared on sections of pipework subject to severe stress. The damage occurred after about

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S/104/60/000/011/001/001
E194/E484

Corrosion Cracking of Austenitic Steels in Thermal Power Installations With Super-High Steam Conditions

6000 hours service, a number of other cracks were found and others continued to appear for some months. These defects were all associated with the tests on salt deposit formation. A number of operating troubles experienced at the Cherepet' Station are reviewed, here the rated steam conditions at the turbine stop valve are 170 atm 550°C. Damage due to corrosion under stress took place in the first period of operation in the convective part of the super-heater made of steel EI-257. The feed water conditions have since been modified and the trouble has now been overcome. The most serious cases of failure of tubes of austenitic steel under stress occurred in the West German Chemical Works of Hüls. Details of this case obtained from German published work are given. It is concluded that austenitic steels work quite reliably provided that proper allowance is made for their specific features including the tendency to corrosion cracking in aggressive media, low thermal conductivity and high coefficient of linear expansion. Caustic soda and chlorides act as corrosive

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S/104/60/000/011/001/001
E194/E484

Corrosion Cracking of Austenitic Steels in Thermal Power Installations With Super-High Steam Conditions

medium during boiler operation. The action of chlorides is intensified if the amount of oxygen in solution is increased. The weakest places are those with unrelieved remanent stresses, particularly bends of small radius, welded joints and the like, and so these should be carefully heat treated to remove the stresses before use. In the operation of water purification systems, the instructions should be strictly observed and in particular correct regeneration of the anionite filters is essential. If caustic soda or other non-volatile alkalis get into the feed water they will cause corrosion cracking of austenitic steel in a very short period of time. To avoid corrosion cracking, the stresses on the metal should not be excessive, particularly variable stresses, and the working media that comes into contact with the metal should be of appropriate purity. Austenitic steels can also be subject to cracking in acid solutions but this question is not yet fully understood. There are 1 figure and 6 references: 3 Soviet and 3 German.

Card 3/3

PROKHOROV, F.G., kand.tekhn.nauk; AKOL'ZIN, P.A., doktor tekhn.nauk; SHKROB, M.S.

Basic problems pertaining to the treatment of feed water for steam power plants during the current seven-year plan. Teploenergetika 7 no.3:3-8 Mr '60. (MIRA 13:5)

1. Ministerstvo stroitel'stva elektrostantsiy, Vsesoyuznyy teplotekhnicheskiy institut i Energeticheskiy institut AN SSSR.
(Feed-water purification) (Steam power plants)

AKOL'ZIN, P.A., doktor tekhn.nauk; MIKHAYLOVA, N.M.

Treating water with hydrazine for protection of the metal of boilers against acid corrosion. Teploenergetika 7 no.7: 59-64 Jl '60. (MIRA 13:7)

1. Vsesyuznyy teplotekhnicheskiy institut.
(Feed-water purification)
(Corrosion and anticorrosives)

GULYAYEV, V.N.; AKOL'ZIN, P.A.; IVANOV, Ye.N.; GROMOVA, Ye.S.

Use of rapid method of determining the tendency of metals to corrosive cracking. Zav.lab. 26 no.3:340-341 '60. (MIRA 13:6)

1. Vsesoyuznyy teplotekhnicheskiy nauchno-issledovatel'skiy institut im. F.E. Dzerzhinskogo.
(Metals—Corrosion)

AUTHORS: Gulyayev, V. N., Akol'zin, P. A., Ivanov, Ye. N., Gromova, Ye. S.

S/032/60/036/03/034/064
B010/B117

TITLE: On the Application of a Rapid Method of Determining the Liability of Metals to Corrosive Cracking

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol 36, Nr 3, pp 340-341 (USSR)

TEXT: A method used to estimate the resistance to corrosion of steels was suggested by the TsNIITMASh. The deterioration of the plastic properties of the metal in liquid corrosive substances is compared with the deterioration established when tests are performed in air with the state of the sample surface after the test also being considered. As this method gives no specific data concerning the type of corrosive substance, corresponding tests were performed in this case with an austenite steel of the type 1Kh18N9T in substances with a weak corrosive action. Experimental conditions and results obtained are given (Table). The samples were submitted to several preliminary thermal treatments before testing. It was found that the afore-mentioned test method cannot be used in substances with a weak corrosive action in which the extension of cracks formed by corrosion is very small (as compared to the elongation rate of the sample). There are 1 table and 2 Soviet references.

Card 1/2

SHKROB, Mikhail Samoylovich, doktor tekhn. nauk; PROKHOROV, Fedor Georgiyevich, kand. tekhn. nauk. Prinimali uchastiye: AKOL'ZIN, P.A., doktor tekhn. nauk; APEL'TSIN, I.E., doktor tekhn. nauk; ZENKEVICH, Yu.V., kand. tekhn. nauk; KVYATKOVSKIY, V.M., kand. tekhn. nauk; KLYACHKO, V.A., doktor tekhn. nauk; GURVICH, S.M., inzh.; ORZHEROVSKIY, M.A., inzh.; STYRIKOVICH, M.A., retsenzent; MARTYNOVA, O.I., retsenzent; VORONIN, K.P., tekhn. red.

[Water treatment and water systems for steam-turbine electric power plants] Vodopodgotovka i vodnyi rezhim paroturbinnykh elektrostantsii. Moskva, Gos. energ. izd-vo, 1961. 470 p. (MIRA 14:9)
(Feed water purification) (Steam turbines)

S/096/61/000/002/008/014
E111/E194

AUTHORS: Akol'zin, P.A., Doctor of Technical Sciences, and Korneyeva, L.V., Engineer

TITLE: Influence of Chloride Ions on Stress Corrosion of Type 1Kh18N9T (1Khl8N9T) Austenitic Steel

PERIODICAL: Teploenergetika, 1961, No.2, pp. 55-60

TEXT: The authors give examples of rapid cracking of stressed austenitic steel boiler tubes in contact with water containing salts (Refs 1-3). The object of the present work was to find the chloride concentration limits at which cracking of type 1Kh18N9T (1Khl8N9T) stainless steel in the austenitic and work-hardened states is either eliminated or greatly retarded. Specimens were contained in sealed 190 mm long stainless steel capsules together with 100-110 ml of the test solution. Specimens consisted of rolled 75 x 10 x 2 mm plates which were assembled in pairs, clamped together at each end and separated in the middle by a rod (Fig.2), to give the required stress (somewhat over yield-point strength), clamps and rod being also of 1Khl8N9T steel. The filled capsules, which had been de-aerated and sealed, were kept at 370 °C in an air thermostat

S/096/61/000/002/008/014
E111/E194

Influence of Chloride Ions on Stress Corrosion of Type 1Kh18N9T Austenitic Steel

(Fig.1). Each capsule contained two pairs of specimens, one pair being of non-work hardened, the other of 30% work hardened steel. Pressure (200 atm) was directly measured in one of the capsules. Test duration was 2000 hours. On completion, specimens were subjected to metallographic examination, one of each pair being further bent through 90°. One series of tests was with chloride ion concentrations of 0.01, 0.02, 0.1, 10, 100, 1000, 10 000 and 100 000 mg/litre; and a further series with 100, 200, 400, 600, 800, 1000, 1200 and 1600. In these pH was 7 and the initial oxygen content 0.02 mg/litre. Both these were varied in a few of the capsules to find their influence. Results are tabulated and typical microstructures are shown in Figs 3-6. Fig.3 shows initial microstructures of the work-hardened steel; Fig.4 those obtained with various chloride-ion concentrations. In Fig.5 (extreme left) the microstructures obtained after testing at pH = 11 and with different oxygen contents are shown. A faulty capsule produced evaporation of the solution, giving particularly severe cracking

Card 2/3

S/096/61/000/002/008/014
E111/E194

Influence of Chloride Ions on Stress Corrosion of Type 1Kh18N9T Austenitic Steel

(Figs 6 and 7). The work showed that stress corrosion is stimulated by both chloride ions and alkali and that work-hardening is a major factor (the 30% work hardening used in the tests would be quite inadmissible in practice). A chloride concentration of 1000 mg/litre produced stress corrosion of the work-hardened material, further concentration increasing having no further accelerating effect. Cracks formed both in stretched and compressed portions of the specimen. The authors emphasise the importance of metal quality and design factors in preventing stress corrosion in power-station plant.
There are 7 figures, 2 tables and 4 references: 3 Soviet and 1 German.

Card 3/3

18.8310

28566

S/137/61/000/009/070/087
A060/A101

AUTHORS: Akol'zin, P. A., Korneyeva, L. V.

TITLE: The study of stress corrosion of various grades of steel as applied to the operation of steam-generators of atomic electric power stations.

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 9, 1961, 53, abstract 9I361 (V sb. "Korroziya reaktorn. materialov". Moscow, Atomizdat, 1960, 108-120)

TEXT: It was attempted to determine the role of the salt composition and heat-treatment (Cl^- and O_2) in the development of corrosion under stress in steels of various grades, among them also in specimens of welded steel. Cracking of austenitic stainless steels as result of corrosion under stress takes place in the water containing Cl^- and molecular O_2. The intensity of corrosion under stress depends upon the pressure (temperature), increasing considerably with the temperature raise. In media with increased Cl^- content the welded specimens of austenitic stainless steel are more sensitive to corrosion under stress. Welded joints of austenitic stainless steel should not be used in the direct flow

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The study of stress corrosion ...

circuit of the steam generator, where high Cl^- concentrations in the zone of end vaporization are unavoidable. A safe method of preparing additional water for steam generators for the purpose of lowering the Cl^- concentration is complete chemical desalting of the water. Before the water is fed to the heating surface, its complete deoxidation is necessary. It is recommended to supply feeding water into the steam space for its complete deoxidation, before proceeding into the water space, i.e., into the boiler water.

V. Tarisova

[Abstracter's note: Complete translation]

Card 2/2

18.8310

28567
S/137/61/000/009/071/087
A060/A101

AUTHORS: Akol'zin, P. A., Korneyeva, L. V.

TITLE: Study of stress corrosion of steel 1Х18Н9Т (1Kh18N9T) as a function of the state of the metal and composition of the medium

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 9, 1961, 53, abstract 9I362 (V sb. "Korroziya reaktorn. materialov". Moscow, Atomizdat, 1960, 120-139)

TEXT: An investigation was carried out upon the limiting admissible concentrations of Cl^- and O_2 in water at which the absence of cracking will be ensured for specimens of austenitic stainless steel 1Kh18N9T tested at one and the same rated stress under conditions of high temperature and pressure of the aqueous medium (pressure 200 atm, temperature 364°C). The Cl^- and alkali hydroxide contained in the water are stimulators of corrosion under stress in steel grade 1Kh18N9T. The simultaneous action of the Cl^- and the O_2 contained in the water causes the corrosion cracking of even the austenized steel 1Kh18N9T. The state of the metal (heat-treatment, cold-hardening, etc.) is of decisive importance in the development of the process of corrosion under stress: the sensitivity of

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28567 S/137/61/000/009/071/087
A060/A101

Study of stress corrosion of steel 1Х18Н9Т ...

cold-hardened specimens is higher than that of those without hardening. A 30% cold-hardening is inadmissible. Taking into account the unavoidability of some cold-hardening under the conditions of the steam-generator manufacture, the limiting admissible concentration of Cl^- in the water in the region of the vaporization zone is 1,000 mg/liter. The quality requirements upon the supply water fed into the steam-generator, operating according to the direct flow system, are enumerated. As complete deaeration of the supply water as possible is recommended, as well as the maintenance of a weakly alkaline medium in the steam generator.

V. Tarisova

[Abstracter's note: Complete translation]

Card 2/2

AKOL'ZIN, P.A., doktor tekhn.nauk; KOROLEV, N.I., inzh.; LAZAREVA, K.I., inzh.; ZAYTSEVA, Z.I., inzh.; POLOVINKINA, T.A., tekhnik

Use of film-forming amines for preventing corrosion in condenser systems. Teploenergetika 8 no.3:49-52 Mr '61. (MIRA 14:9)

1. Vsesoyuznyy teplotekhnicheskiy institut - Lenenergo.
(Condensers (Steam))—Corrosion)

25666
S/096/61/000/009/003/008
E193/E183

18.8300

AUTHORS: Gulyayev, V.N., Candidate of Technical Sciences, Akol'zin, P.A., Doctor of Technical Sciences, Gromova, Ye.S., Engineer, and Ivanov, Ye.N., Engineer.

TITLE: Stress-corrosion cracking of Steel 1Kh18N9T (1Kh18N9T) in sodium hydroxide and sodium chloride solutions

PERIODICAL: Teploenergetika, 1961, 8 No.9, pp. 50-55

TEXT: Stress-corrosion cracking of austenitic stainless steel tubes that has occurred at several power stations (both in the Soviet Union and abroad), where they are used in the steam generating plant operating under particularly severe conditions, prompted the present authors to undertake the investigation described in the present paper. The experiments were carried out on tubular specimens, tested on equipment designed to simulate conditions obtaining in industrial practice. The composition of this steel varied within the following limits: 0.09-0.11% C; 0.85-1.24% Mn; 0.46-0.56% Si; 0.02% S; 0.015% P; 18.3-20.3% Cr; 9.7-10.2% Ni; and 0.5-0.6% Ti. In the actual tests the specimens,

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Stress-corrosion cracking of ....

filled with the appropriate solution (hot or cold) under pressure of up to 120 atm were stressed in tension, and either time-to-rupture was determined, or the extent (if any) of cracking was periodically measured. The concentration of NaOH in the test solutions varied between 40 and 40 000 mg/ℓ., the Cl^- concentration in the NaCl solution varying between 0.3 and 150 000 mg/ℓ. (In some tests hydrazine was added to the NaCl solution). Solutions, both deaerated and saturated with oxygen, nitrogen or argon, were tested. The effect of stress concentration was also studied by using specimens with a sudden change in the cross-section area. Finally, the effect of exposure to the corroding medium alternating with dry periods was studied. The results can be summarised as follows. 1) Under certain conditions, NaOH solutions can cause stress-corrosion cracking of steel 1Kh18N9T, even when the latter is in the fully austenitic state. 2) A 4% NaOH solution (pH = 14) can cause cracking of this steel or cause the development of leaks in faulty portions of a component in a time as short as several hours. 3) No stress-corrosion cracking was observed in specimens stressed for 900 hours at

Stress-corrosion cracking of ....

30 kg/mm^2 in contact with NaOH solutions of pH = 11, 12 or 13, at 310 °C and under a pressure of 120 atm. This means that failures due to stress-corrosion of steel 1Kh18N9T components in heat exchangers are most likely to occur in the regions of high NaOH concentration. 4) The rate of stress-corrosion is decreased when large quantities of oxygen or nitrogen are present in the NaOH solution. The time-to-rupture of the steel studied, subject to the action of a 4% NaOH solution with a nitrogen content of 1100-2000 mg/ℓ is 3-20 times longer than that in a solution with a nitrogen content of 15.8 mg/ℓ only. The effect of argon is similar, but not so pronounced. This is illustrated in Fig.4, showing the strain/time (mm/h) curves for specimens tested under a stress of 35 kg/mm^2 in a 4% NaOH solution, non-deaerated (curve 1), saturated with argon (curve 2), and saturated with air (curve 3). 5) Chlorine ions cause stress-corrosion cracking of steel 1Kh18N9T only in the presence of oxygen, the rate of corrosion at a given oxygen content increasing with increasing Cl^- concentration. When both oxygen and depolarising action of the H^+ ions are absent, no stress-corrosion of steel 1Kh18N9T takes place in aqueous

Stress-corrosion cracking of ....

solutions of NaCl, with the Cl^- content of up to 150 000 mg/ℓ. 6) In the presence of traces of oxygen, stress-corrosion of the steel studied can occur at both low (100 mg/ℓ) and high (150 000 mg/ℓ) Cl^- concentrations, but only if other contributing factors (such as non-uniform stress distribution, local damage of the protective oxide skin, etc.) operate. 7) At higher oxygen contents, stress-corrosion cracking of steel 1Kh18N9T can occur in water (at 310 °C and under a pressure of 120 atm) with a Cl^- content as low as 20 mg/ℓ. Thus, specimens simultaneously subjected to stress (35-40 kg/mm^2) and to the action of a solution (at 120 atm and 310 °C) containing 20 - 100 000 mg/ℓ Cl^- and 450 mg/ℓ O_2, can fracture in several hours. 8) Addition of up to 15 mg/ℓ hydrazine has no harmful effect, no cracking having been observed in specimens tested for 3590 hours at 310 °C and under 120 atm in a solution containing 100 mg/ℓ Cl^- and 15 mg/ℓ N_2H_4. 9) Other factors (the Cl and O concentration) being equal, the rate of stress-corrosion cracking of steel 1Kh18N9T is increased approximately twentyfold under conditions of exposure to the corroding medium alternating with drying.

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Stress-corrosion cracking of S/096/61/000/009/003/008
E193/E183

It was concluded that, if there is a possibility of steel 1Kh18N9T coming into contact with a corroding medium of the type studied, the bends in coiled tubes should be subjected to an austenitising treatment, and that no surface defects with residual tensile stresses, not removed by appropriate heat treatment, can be tolerated under these circumstances. The results of the present investigation indicate also that metal-liquid-gas and not metal-liquid systems should be investigated in studies of stress-corrosion phenomena.
There are 9 figures, 5 tables and 4 references: 2 Soviet and 2 non-Soviet. The English language reference reads as follows:
Ref.3: W.J. Singley, C.H. Welinsky, S.F. Whirl, H.A. Klein. "Stress corrosion of stainless steel and boiler water treatment at Shippingport Atomic Power Station". Proc. Amer. Power Conf. 21, 1959. Chicago III, Illinois Inst. Technol. 1959.
ASSOCIATION: Vsesoyuznyy teplotekhnicheskiy institut
(All-Union Institute of Heat Engineering)

Card 5/6

AKOL'ZIN, P.A., doktor tekhnicheskikh nauk; SHREYDER, A.V., dotsent, kand. tekhn.nauk

"Theory of the corrosion and protection of metals" by N.D. Tomashov. Reviewed by P.A. Akol'zin. Zav. lab. 27 no. 4:503 '61. (MIRA 14:4)

(Corrosion and anticorrosives) (Tomashov, N.D.)

2808

26384
S/032/61/027/008/007/020
B107/B206

18.8310

AUTHORS: Gulyayev, V. N., Akol'zin, P. A., Gromova, Ye. S., and Ivanov, Ye. N.

TITLE: Rapid method for testing austenitic steel with regard to its cracking tendency in aqueous sodium-chloride solutions

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 8, 1961, 983-984

TEXT: For the rapid determination of the corrosion-cracking tendency of various types of steel in aqueous chloride solutions, a boiling 42 % solution of $MgCl_2$ is sometimes used. As to its composition this solution does, however, not correspond to the media in which many devices operate; these are affected by aqueous sodium-chloride solutions. V. M. Nikiforova proposed a rapid method (Ref. 1: V. N. Nikiforova. Sb. TsNIITMASh, kn. 77 (1955)) by which the corrosion-cracking tendency of steel can be estimated from the variation of plasticity during elongation of the specimen in a solution. However, this method is not generally applicable, and fails if the formation of corrosion cracks is much slower than the elongation

Card 1/3

Rapid method for...

of the specimen (Ref. 2: V. N. Gulyayev, P. A. Akol'zin, Ye. S. Gromova and Ye. N. Ivanov, Zavodskaya laboratoriya, v. 26, no. 3 (1960)). A new method was elaborated by the authors. They proceeded from the fact that at a higher temperature and a higher oxygen content in the solution, the formation of corrosion cracks proceeds more quickly. In addition, the rate of formation also depends on the chlorine-ion concentration. Stand ВТИ-1 (VTI-1) (Ref. 3: P. A. Akol'zin, V. N. Gulyayev. Stend VTI-1 dlya ispytaniya metallov na dlitel'nuyu korrozionnuyu prochnost' pri vysokikh davleniyakh i temperaturakh raboohey sredy, tema 20 NM-59-475/177 (1959)) is used for testing tubular specimens in a solution which is continuously saturated with oxygen. In order to accelerate the formation of corrosion cracks, the following test conditions were chosen: constant load on the specimen, temperature 310°C, pressure of the medium 120 kg/cm^2, concentration of chloring ions 100,000, of oxygen 450, nitrogen 1050 mg per liter of solution. Specimens of 1 Х 18 Н9Т (1Kh18N9T) steel were tested. At a load of 35 kg/mm^2, the specimen was destroyed in 24 hr 35 min, and at a load of 40 kg/mm^2 in 16 hr. When the load was reduced the time up to destruction increased accordingly (Fig. 1). The elaborated method permits a comparatively rapid estimate of the cracking tendency of various types

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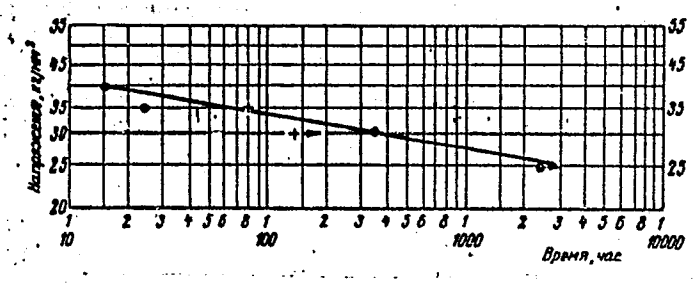
Rapid method for...

of steel in sodium-chloride solutions. There are 2 figures and 3 Soviet references. [Abstracter's note: Essentially complete translation.]

ASSOCIATION: Vsesoyuznyy teplotekhnicheskiy nauchno-issledovatel'skiy (All-Union Scientific Research Institute of Heat Engineering)



Legend to Fig. 1: (x) Time in hr; (y) load in kg/mm^2; (•) divided specimens (12 by 2.0 mm); (+) undivided specimens (13 by 1.5 mm).

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L 23561-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) JD/HW/WB

AM4040731 BOOK EXPLOITATION S/

Akol'zin, Pavel Alekseyevich; Gulyayev, Viktor Nikolayevich

Corrosion cracking of austenitic steels in heat-power plant equipment (Korrozionnoye rastreskivaniye austenitnykh staley [illegible]), Moscow, Gosenergoizdat, 19[illegible], [illegible] p. [illegible]

TOPIC TAGS: austenitic steel, stainless steel, [illegible], stress corrosion, corrosion cracking, steel corrosion cracking, stress corrosion prevention, corrosion cracking prevention, austenitic [illegible], stress corrosion

PURPOSE AND COVERAGE: This book is intended for engineering personnel of electric power stations, research, planning [illegible] The book [illegible] power plants [illegible] parameters and in atomic power stations. The book summarizes materials based on investigations and operational data accumulated by the All-Union Scientific Research Institute of Heat Engineering [illegible] Soviet and non-Soviet [illegible] tion of corrosion cracking. [illegible] There are [illegible] references, both Soviet and non-Soviet.

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AM4040731

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AM4040731

SUB CODE: ML, MA SUBMITTED: 19Sep63 NO REF SOV: 113

OTHER: 069

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AM4016089 BOOK EXPLOITATION S/

Akol'zin, Pavel Alekseyevich (Doctor of Technical Sciences), Gerasimov, Vladimir Vladimirovich (Doctor of Technical Sciences)

Corrosion of structural materials of nuclear and thermal power plants (Korroziya konstruktsionny*kh materialov yaderny*kh i teplovy*kh energeticheskikh ustanovok), Moscow, "Vysshaya shkola", 1963, 373 p., illus., biblio., 2,500 copies printed.

TOPIC TAGS: corrosion, nuclear power plant, thermal power plant, carbon steel, steam generator, steam boiler, low alloy steel, steel EI 257, steel 2Kh13, steel Kh17, 1Kh18N9T, electrochemistry

TABLE OF CONTENTS [abridged]:

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AM4016089

SUB CODE: ML, CH, NS SUBMITTED: 7 Mar 63 NR REF SOV: 124

OTHER: 234 DATE ACQ: 23 Jan 64

Card 2/2

S/096/63/000/003/001/010
E194/E455

AUTHORS: Akol'zin, P.A., Doctor of Technical Sciences,
Ivanov, Ye.N., Engineer

TITLE: A method of studying corrosion by measuring the electrical resistance of specimens

PERIODICAL: Teploenergetika, no.3, 1963, 8-12

TEXT: Corrosion is assessed by change of resistance of three series-connected steel wire specimens each 1300 mm long and 0.5 mm diameter, strung axially in three glass tubes through which the medium flows. This equipment requires careful thermostatting but another rig made of metal for tests at higher temperatures and pressures did not; neither did test equipment used with full-scale boilers. Weight loss is determined at the end of tests. Loss of a given weight of metal causes greater increase of resistance if there is local pitting than if corrosion is uniform. To express the uniformity of corrosion a formula is derived for the corrosion distribution index PK in the form

$$PK = \frac{1}{L} \cdot 100 = \frac{100 \Delta p \Delta R}{p_o \Delta R - R_o \Delta p} \% \qquad (13)$$

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A method of studying ...

The following expression is derived for the mean rate of penetration of corrosion on the corroded section

$$\Pi' = \frac{(d_o - d_1)8800}{2\tau} = \frac{4400 d_o}{\tau}\left(1 - \sqrt{\frac{R_o \cdot \Delta p}{p_o \cdot \Delta R}}\right), \text{ mm/year} \qquad (14)$$

where τ - time, hours, ℓ - the equivalent length of wire which is pitted, d_1 - the equivalent diameter of pitted wire corresponding to the length ℓ, L - overall length of specimen, p - weight, R - resistance. If corrosion is reasonably uniform, the value of PK is approximately unity and then there is no need to weigh the specimen. The method was checked in various media of known corrosive properties some of which (mostly with pH less than 7) gave fairly uniform corrosion and others (mostly with pH greater than 7) gave local (oxidative) corrosion. The method is highly sensitive particularly in quantitative assessment of local corrosion. To exemplify this, test results are given showing how the passivating tendency of hydrogen peroxide is allied to a tendency to cause local corrosion. The sensitivity of the method was also demonstrated by periodically arresting the

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flow of medium without permitting access of oxygen; corrosion was virtually absent during the standstill periods. Results obtained by this procedure are in reasonable agreement with assessment of corrosion by measurement of corrosion products in the medium leaving the specimen. The method may be used to assess either media or metals. There are 7 figures and 3 tables.

ASSOCIATION: Vsesoyuznyy teplotekhnicheskiy institut
(All-Union Heat-engineering Institute)

AKOL'ZIN, P.A., doktor tekhn. nauk; GULYAYEV, V.N., kand. tekhn. nauk; TALOV, N.P., inzh.; IVANOV, Ye.N.

Corrosion and mechanical properties of steel substitutes for 1Kh18N9T steel. Teploenergetika 10 no.8:54-59 Ag '63. (MIRA 16:8)

1. Vsesoyuznyy teplotekhnicheskiy institut.
(Steel)

AKOL'ZIN, P.A., doktor tekhn.nauk; GULYAYEV, V.N., kand.tekhn.nauk

Testing of a pipeline with protective sheathing. Teploenergetika 11 no. 1:32-36 Ja '64. (MIRA 17:5)

1. Vsesoyuznyy teplotekhnicheskiy institut.

AKOL'ZIN, P.A., doktor tekhn. nauk; PROKHOROV, F.G., kand. tekhn. nauk

Polymers and their prospective use in thermal power engineering. Teploenergetika 11 no.5:31-35 My'64. (MIRA 17:5)

1. Vsesoyuznyy teplotekhnicheskiy institut.

AKOL'ZIN, P.A.

Corrosion of the equipment of thermal electric power plants. Vodopod., vod. rezh. i khimkont. na parosil. ust. no.1:33-41 '64. (MIRA 18:2)

1. Vsesoyuznyy ordena Trudovogo Krasnogo Znameni.

AKOL'ZIN, P.A., doktor tekhn. nauk; PROKHOROV, F.G., kand. tekhn. nauk; MAN'KINA, N.N., kand. tekhn. nauk

Problem concerning the water cycle norms of thermal electric power plants. Teploenergetika 11 no.4:77-79 Ap '64. (MIRA 17:6)

1. Vsesoyuznyy teplotekhnicheskiy institut.

AKOL'ZIN, P.A., doktor tekhn. nauk; LAPTINA, L.N., inzh.

Corrosion effect of phosphation conditions of boiler water.
Teploenergetika 11 no.10:7-11 O '64. (MIRA 18:3)

1. Vsesoyuznyy teplotekhnicheskiy institut.

AKOL'ZIN, P.A.; GERASIMOV, V.V.; KASPEROVICH, A.I.; MAMET, A.P.; MAN'KINA, N.N.; MARGULOVA, T.Kh.; MARTYNOVA, O.I.; MIROPOL'SKIY, Z.L.; Prinimali uchastiye: DYATLOVA, N.M.; BIKHMAN, B.I.; STYRINKOVICH, M.A., retsenzent; KOSTRIKIN, Yu.M., red.

[Water system of thermal electric power plants (ordinary and atomic)] Vodnyi rezhim teplovykh elektrostantsii (obychnykh i atomnykh). [By] P.A.Akol'zin i dr. Moskva, Energiia, 1965. 382 p. (MIRA 18:3)

AKOL'ZIN, P.A., doktor tekhn. nauk; KAGAN, D.Ya., kand. tekhn. nauk;
BALABAN-IRMENIN, Yu.V., inzh. [illegible], B.I., kand. tekhn. nauk

Protection of the heavy duty boiler units using nitrogen.
Teploenergetika 12 no.3:17-21 Mr '65. (MIRA 18:6)

1. Vsesoyuznyy teplotekhnicheskiy institut.

AKOL'ZIN, P.N.; ARAKEL'YANTS, N.M.; BUYANOVA, O.A.; KIRNOSOV, V.I.; KISELEVSKIY, S.L.; TARAPIN, V.N.; SHCHEDROVITSKIY, S.S.; EYDEL'MAN, R.Ya.

Unified series of strain gauges for the automation of construction and road machinery. Priborostroenie no.8:11-12 Ag '62. (MIRA 15:9)

(Strain gauges)

AKOL'ZINA, L. A.

Electrical Engineering Abstracts
May 1954
Reactors and Relays

① E Electronics - Physics

2032. Field of a cylindrical multi-layer solenoid. L. A. AKOL'ZINA. *Elektrichestvo*, 1953, *No.* 7, 60–3. *In Russian.*

The field of solenoids used for magnetic measurements, particularly in the investigations of magnetic properties of materials is required to be as homogeneous and powerful as possible, thus multi-layer solenoids have to be used. The method of designing solenoids with thin coils of finite length is well known; the author generalizes it by making the simple and permissible assumption of concentrical solenoids the radii of which increase in an arithmetical progression, obtaining formulae for solenoids of infinite and finite length and, in the second case, determining the poles of both types. The results represented in relative units are plotted and enable the field distribution in practical cases to be found rapidly using only elementary calculations. Z. F. KRAUS

9(4)

AUTHOR: Akol'zina, L.A. SOV/55-58-2-15/35

TITLE: The Effect of Radiation on Preconduction Current Pulses in Tubes With Exterior Electrodes (Vliyaniye oblucheniya na predrazryadnyye impul'sy toka v trubkakh s vneshnimi elektrodami)

PERIODICAL: Vestnik Moskovskogo Universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958, Nr 2, pp 115-120 (USSR)

ABSTRACT: In tubes exterior electrodes there exist two discharge stadiums: a stable and an unstable stadium. In a series of tests with neon tubes it was investigated with which processes the formation of current impulses is connected for unstable discharge. It was stated that it essentially concerns processes on the tube walls. Furthermore the influence of radiation with red lines of the neon spectrum on the current impulses taking place before the discharge was investigated. It appeared that the origin of the current impulses for small voltages essentially depends on the metastable atoms while for high voltages the metastable atoms are not important. The author thanks Professor N.A. Kaptsov. There are 2 figures, and 11 references, 1 of which is Soviet, 5 are German, 4 English, and 1 Dutch.

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The Effect of Radiation on Preconduction Current Pulses in Tubes With Exterior Electrodes SOV/55-58-2-15/35

ASSOCIATION: Kafedra elektroniki (Chair of Electronics) [Moscow Univ.]

SUBMITTED: June 19, 1957

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AKOL'ZINA, L. A., Candidate Phys-Math Sci (diss) -- "Investigation of precon-duction current impulses at reduced pressure". Moscow, 1959. 10 pp (Moscow Order of Lenin and order of Labor Red Banner State U im Lomonosov, Phys Faculty), 200 copies (KL, No 24, 1959, 124)

AKONDZHANYAN, V.R., kand.med.nauk

Regularities in the reconstruction of the long tubular bones in children during various periods after a fracture. Ortop., travm.i protez. 23 no.6:24-29 Je '62. (MIRA 15:9)

1. Iz 2-go khirurgicheskogo otdeleniya detskoy bol'nitsy im. N.F. Filatova g. Moskvy (glavnyy vrach - L.A. Vorokhobov, konsul'tant chlen-korrespondent AMN SSSR prof. B.V. Ognev).
(FRACTURES)

AKONOV, A.

AID P - 834

Subject : USSR/Mining

Card 1/1 Pub. 78 - 19/26

Author : Akonov, A. (Foreman of the Kirov Oil Well Drilling Bureau)

Title : Resources for high speed drilling

Periodical : Neft. khoz., v. 32, #9, 84-87, S 1954

Abstract : A review of the application of various technological improvements and advanced methods of turbo-drilling for increase of the speed of oil well drilling.

Institution: None

Submitted : No date

L 40347-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6019436 (A) SOURCE CODE: UR/0007/66/000/003/0281/0290 63

AUTHOR: Lavrukhina, A. K.; Kolesov, G. M.; Kalicheva, I. S.; Akol'zina, L. D. 56 B

ORG: Institute of Geochemistry and Analytical Chemistry im. V. I. Vernadskiy, AN SSSR, Moscow (Institut geokhimii i analiticheskoy khimii AN SSSR)

TITLE: Activation determination of Ce, Eu, Sc, Ba, U, and P in dark and clear varieties of Kunashak and Pervomayskiy village chondrites

SOURCE: Geokhimiya, no. 3, 1966, 281-290

TOPIC TAGS: neutron activation analysis, meteorite, radioisotope, cerium, europium, scandium, barium, uranium, phosphorus

ABSTRACT: Neutron activation analysis was used to determine various elements in Kunashak and Pervomayskiy village chondrites. The samples were irradiated with a neutron flux of 1.2×10^{13} n/cm^2 sec. The content of Eu, Sc, Ba, and U in the clear varieties of chondrites of olivine-hypersthene composition generally correspond to the average content previously found in chondrites of this type. The concentration of Eu, Ce, and Sc in hypersthenic chondrites is higher than in enstatite chondrites. In nonmagnetic fractions of the investigated meteorites as compared to their unseparated samples, the content of Ce, Eu, and Sc is higher, owing to the lithophilous character of these elements. The concentration of Eu, Sc, Ba, and U in the dark and clear varieties of Kunashak meteorite is approximately the same. The P concentration in the dark varieties of

Card 1/2 UDC: 550.42+552.6

ACCESSION NR: AP4044386 S/0195/64/005/004/0616/0623

AUTHOR: Akopdzhanov, R. G.; Vaynshteyn, E. Ye.; Keyer, N. P.; Kefeli, L. M.; Rukhadze, Ye. G.

TITLE: X-ray K-absorption spectra of copper in some catalytic chelate polymers

SOURCE: Kinetika i kataliz, v. 5, no. 4, 1964, 616-623

TOPIC TAGS: copper, K-absorption spectrum, chelate, sodium bis-dithiocarbamate, chelate polymer, copper chelate polymer, catalysis, X-ray analysis

ABSTRACT: Polychelates of copper synthesized from sodium bis-dithiocarbamates containing a Cu(SS) chelate unit were investigated by X-ray spectral analysis. The optimal conditions for the study of the fine structure of the principal K-region absorption of copper in polychelates are obtained by working with absorbents having a density of 3.5-5 mg/cm^2; for the study of the fluctuation in an ultra fine structure this should be 10 mg/cm^2. The data on the K-region absorption of metallic copper obtained in these experiments were in good agreement with the spectrum registered by a double-crystal spectrometer. The reproducibility of data in three parallel experiments (the points lay on a single curve) for polychelates with two different radicals $R_5=(C_6H_4)_2$ and $R_3=(CH_2)_6$ was also plotted. When the structure of the X-ray absorption spectrum of a Cu^{2+} ion in aqueous solution was compared with that of copper in some oxygen-and sulfur-containing inorganic compounds (CuS, Cu_2O),

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Card

ACCESSION NR: AP4044386

the general form of the long-wave structure of the spectrum was found to be essentially independent of the change in the ionic charge. It depended rather on the nature of the bond of the electrons in the absorbing atom and the atoms in its close vicinity in the metal or its compounds, especially on the participation in this bond of the electrons with p-symmetry. Upon transition from the spectrum of the metal to that of the oxide, there is a regular shift (~1.5 e.v.) of the spectrum toward the short-wave side. It can be assumed that the valence of copper in the polymers studied is close to unity. Analysis of the long-wave fine structure of the X-ray K-spectra of copper in polychelates in comparison with the spectrum of the metal revealed a change in the valence of copper atoms in polychelates depending on the organic radical in the polymer chain. This change can be due to a change in the degree of overlapping of the sp-functions of electrons producing the bond between the copper atom in the chelate and additives, such as sulfur atoms. In polychelates containing R_4 and R_5 aromatic radicals in the polymer chain, the absorption spectra show a decrease in intensity in the initial and medium regions, as compared to those of metal. In the spectra of polymers containing R_2 and R_3 organic aliphatic radicals, the intensity of absorption is increased in these regions. The difference in the effect of aromatic and aliphatic radicals in the polymer chain on the nature of the reaction of copper with the additives in polychelates is also revealed by the change in the catalytic activity of these polychelates. "The authors thank V. I. Petrosyan for supplying the copper foil."

Card 2/3

Card

ACCESSION NR: AP4044386

Orig. art. has: 8 figures and 1 chemical structure.

ASSOCIATION: Institut katalliza SO AN SSSR (Institute of Catalysis, SO AN SSSR); Institut neorganicheskoy khimii SO AN SSSR (Institute of Inorganic Chemistry, SO AN SSSR)

SUBMITTED: 16Oct63 ENCL: 00

SUB CODE: OC, OP NO REF SOV: 017 OTHER: 002

Card 3/3

AUTHORS: Vaynshteyn, E. Ye.;

type 2(N, S)Cu and 2(N, O)Cu was determined.

Card 1/4

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000100710009-3"

L 63040-65

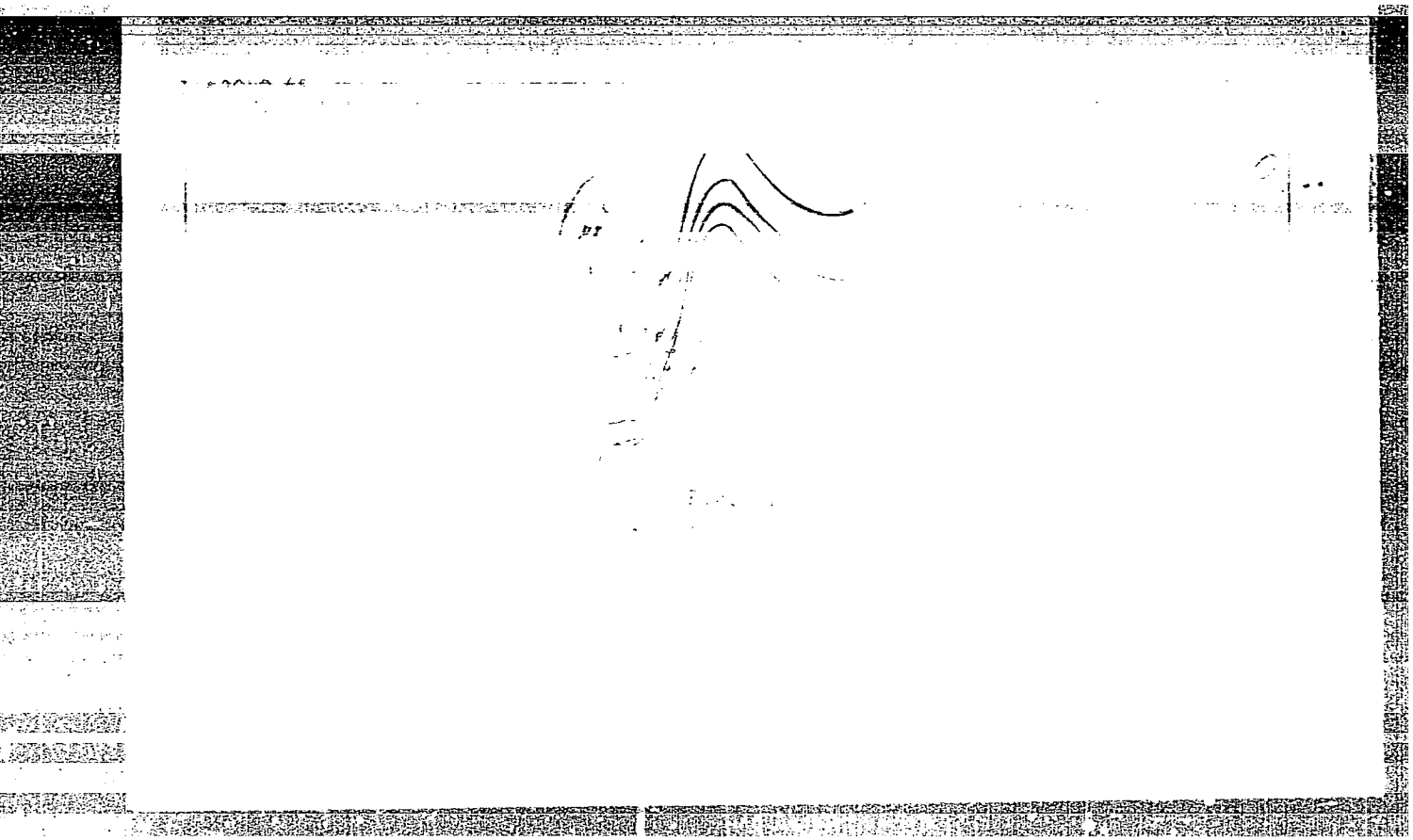
ACCESSION NR: AP5013059

2

Orig. art. has: 10 graphs and 2 illustrations.

SUBMITTED: [illegible]

Card 2/4



APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000100710009-3"

L 43868-65 EWA(k)/EWT(1)/EEC(t) LHB

ACCESSION NR: AP5006439 S/0051/65/018/003/0495/0500

AUTHOR: Akopazhanov, R. G.; Vaynshteyn, E. Ye.

TITLE: A method of correcting x-ray spectra for non-dispersion apparatus distortion

SOURCE: Optika i spektroskopiya, v. 18, no. 3, 1965, 495-500

TOPIC TAGS: x ray spectrum, focusing spectrograph, apparatus function, spectrum distortion

ABSTRACT: It is pointed out in the introduction that the assumption frequently made in accounting for apparatus errors in x-ray spectra, namely that the distortion function has a dispersion character, does not always hold true. In particular, it is shown that when x-ray focusing spectrographs are used with bent crystals, the apparatus function does not always have the form of a dispersion curve and is more readily approximated by a hyperbolic secant. The "method of derivatives," first [illegible] for x-ray spectra by V. P. Sachenko (Izv. AN SSSR ser. fiz. v. 23, 1959, [illegible] has been used to derive theoretical [illegible]

Card 1/2

L 43868-65

ACCESSION NR: AP5006439

2

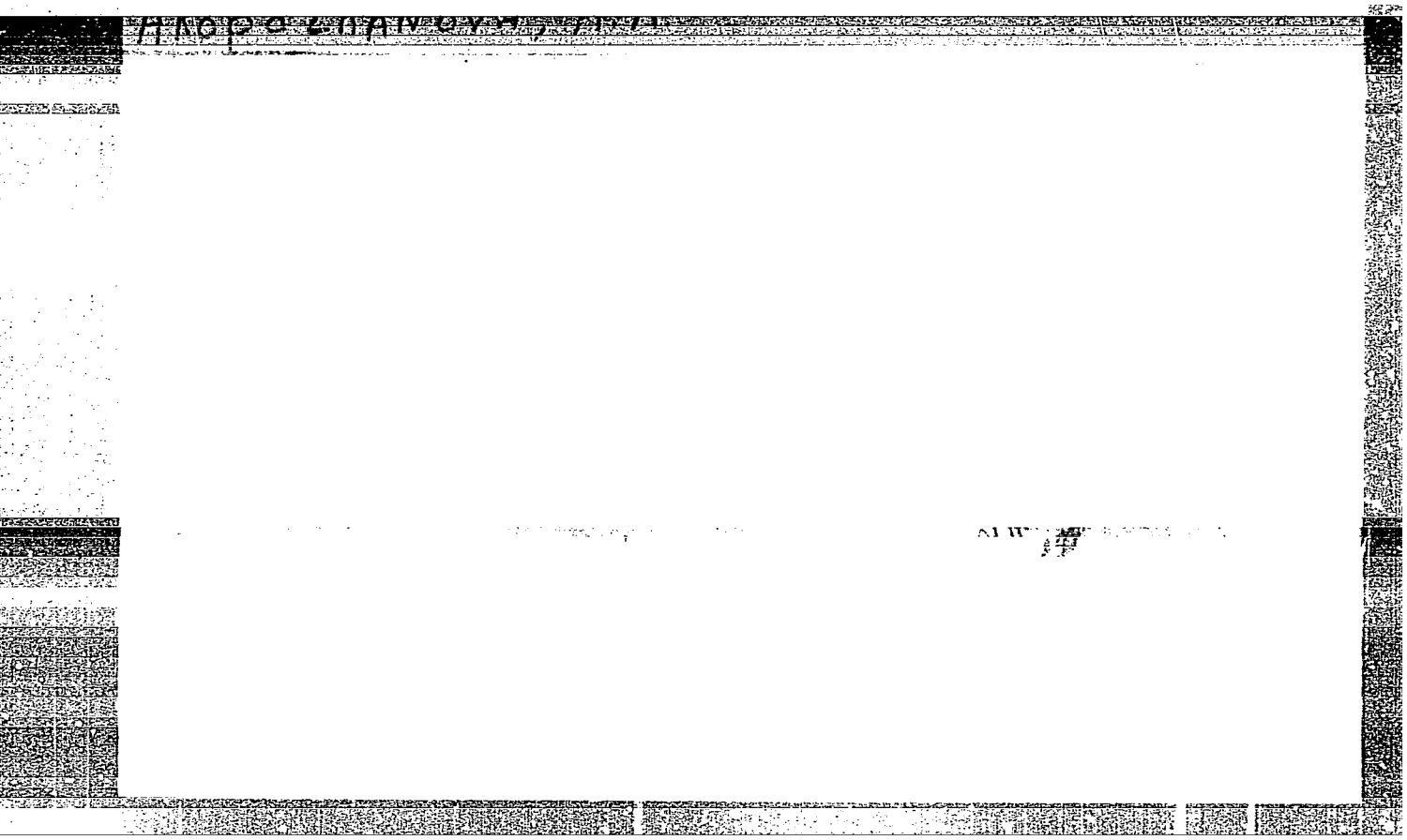
mentally obtained x-ray spectra. The procedure proposed is verified against several model curves and is used to correct K-absorption spectra of copper in metal and in chloride. "The authors thank M. A. Vlokhin and V. F. Sachenko for help during the first stage of the present research." [illegible] has [illegible] figures, [illegible] formulas, and 1 table.

ASSOCIATION: None

SUBMITTED: 03Feb64 ENCL: 00 SUB CODE: OP

NR REF SOV: 012 OTHER: 000

Card 2/2

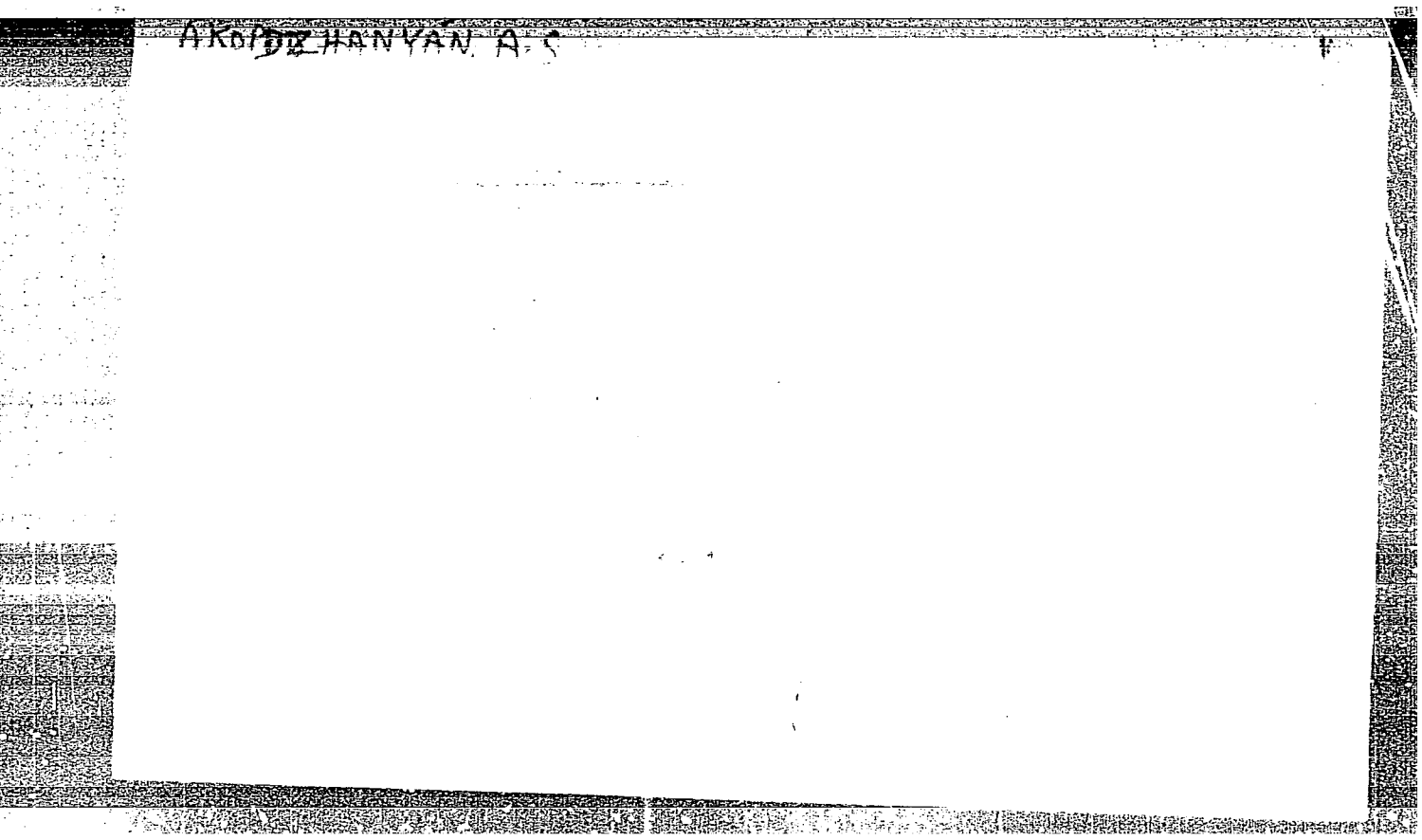


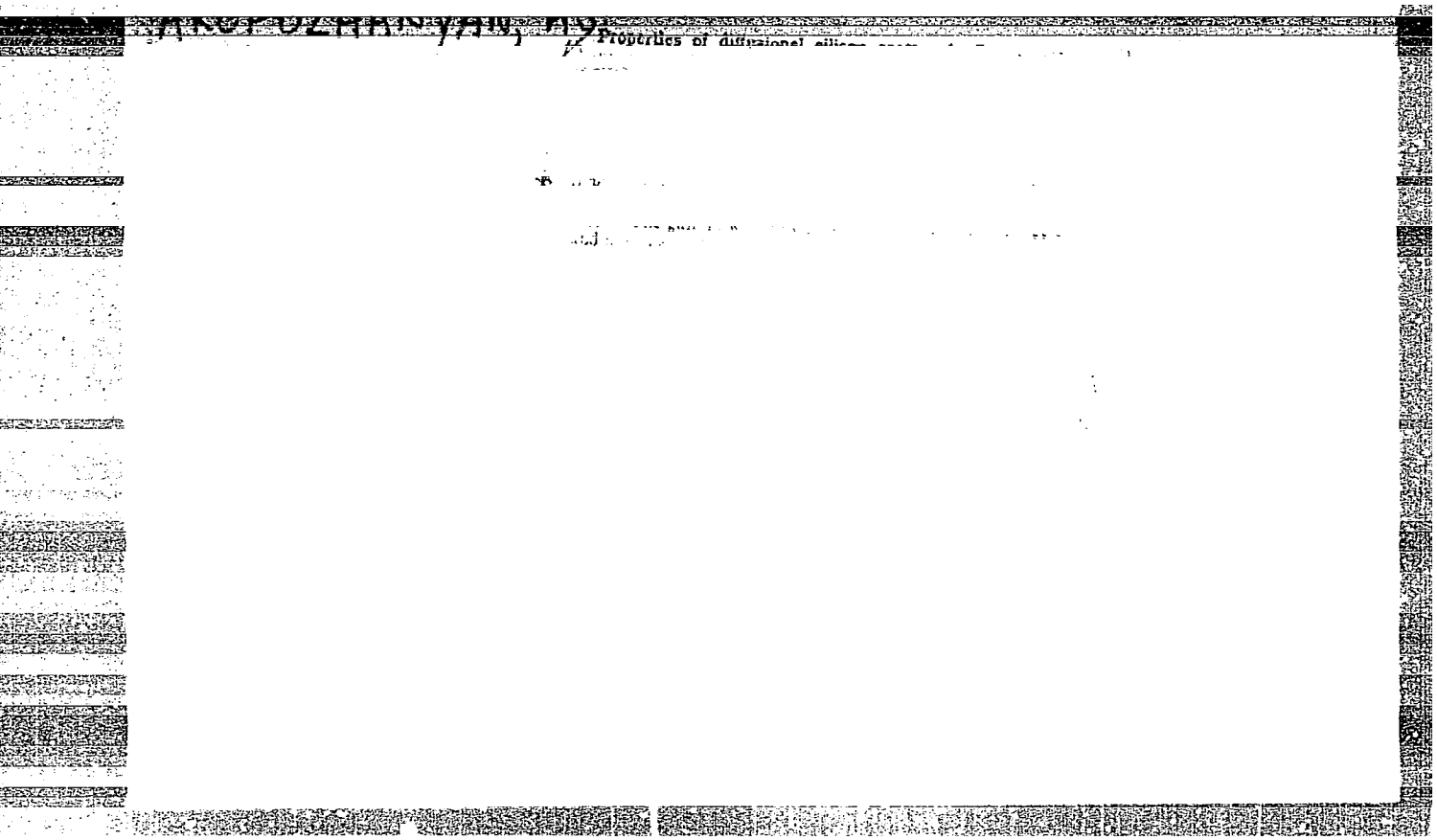
AKOPDZHANOVA, V. R.

AKOPDZHANOVA, V. R. - "The Treatment of Slow-Healing Wounds by the Intra-Arterial Introduction of Medical Substances." Sub 27 Feb 52, Acad Med Sci USSR. (Dissertation for the Degree of Candidate in Medical Sciences).

SO: Vechernaya Moskva January-December 1952

Microhardness of diffused silicon coatings. N. S. Gor-





L 13018-63 EPF(c)/EPR/EWP(j)/EWT(m)/BDS AFFTC/ASD Pr-4/Ps-4/Pc-4 RM/WW
ACCESSION NR: AP3000407 S/0191/63/000/005/0064/0065

AUTHOR: Barshteyn, R. S.; Akopdzhanyan, E. A. 72

TITLE: Methods of enhancing the mold-resistance of polyvinylchloride plastic 15

SOURCE: Plasticheskiye massy*, no 5, 1963, 64-65

TOPIC TAGS: mold-resistance, polyvinylchloride plastic, dimethyl esters, polyester plasticizers, methoxy groups, PF-special resin, plastics

ABSTRACT: Studies were carried out on the selection and synthesis of fungicides to be incorporated in the plasticizer for preventing mold fungus damage to polyvinylchloride pipes, coatings, packaging materials, etc. The following compounds, presumed nonutilizable as nutrients by molds were selected for testing: dimethyl esters, including dimethylphthalate (DMP), dimethyladipinate (DMA), and dimethylsebacate (DMS), and polyester plasticizers containing terminal methoxy (prepared in collaboration with V. G. Gorbunova). Samples of plastics obtained from polyvinylchloride resin ("PF-special" brand) using these plasticizers and calcium stearate as stabilizer were exposed to the action of spores of 7 species of mold fungus in distilled water at a relative humidity of 98-100% and a temperature of around 30C. DMP, DMA, and DMS plactics showed adequate long-term resistance (24 months' observation) to fungus attack, and the plastics prepared with the polyester plasticizers

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L 13018-63
ACCESSION NR: AP3000407

gave excellent long-term protection. Under natural conditions (dry and damp environments), mold resistance was intact after 1 year in the Moscow region, and after 2 years in a subtropical region, though in the latter case mold resistance was slightly lower after 2 years' exposure in the open air. Other plasticizers, such as dibutylphthalate, dioctylphthalate, and dioctylsebacate were found to increase susceptibility to mold, as they are utilized for nutritional purposes. Orig. art. has: 1 table.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 10Jun63 ENCL: 00

SUB CODE: MA NO REF SOV: 002 OTHER: 001

Card 2/2

PALEY, M.I.; TREPELKOVA, L.I.; AKOPDZHANYAN, E.A.; GOLODNAYA, S.L.

Investigating the resistance to fungi of the acoustical materials based on polyvinyl chloride resins. Plast. massy no.2:68-69 '64. (MIRA 17:8)

PESIN, L.M.; DERKOVSKAYA, I.L.; GOLODNAYA, S.L.; PUKHOVITSKAYA, A.N.; AKOPDZHANYAN, E.A.

Removal of formaldehyde from the waste waters of the production of carbamide resins. Plast. massy no.8:58-60 '64.
(MIRA 17:12)

ADONTS, G.T.; AYRAPETYAN, G.A.; AKOPDZHANYAN, G.D.; GAMBURYAN, K.A.

Investigation of the stability of the Transcaucasian Electric Power System in conjunction with the introduction of Mingechaur-Atarbekyan intersystem electric power transmission. Izv. AN Arm.SSR.Ser.tekh. nauk 13 no.6:19-38 '60. (MIRA 14:3)

1. Institut elektrotekhniki AN Armyanskoy SSR.
(Transcaucasia—Interconnected electric utility systems)